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## Histopathology of the placenta and childhood growth

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Although low birth weight is a well known predictor of abnormal growth in children and CVD in adults, there are few epidemiologic studies of the placenta. Data from the National Collaborative Perinatal Project (CPP, n=23,962) show that gross placental measures predict childhood body mass index at age 7. We hypothesized that placental histopathology would predict abnormal infant growth and subsequent childhood growth. We analyzed longitudinal data on 43 infant-mother pairs who participated in the Johns Hopkins CPP. Standard anthropometric measures were collected periodically. An expert pathologist re-read existing placental slides and applied a standardized tool to score histopathology in 3 domains: 1) fetal vascular pathology, 2) pathology of the villi and intervillous space, and 3) uteroplacental pathology. Mean birth weight was 3198 g (range 1021 - 4819 g). Mean placental weight was 452 g (140 - 1036 g). At age 7, mean (SD) BMI was 15.3 kg/m<sup>2</sup> (1.6). Table 1 summarizes multiple linear regression analyses including maternal age and annual household income as covariates. Infant with placentas that were scored  $\geq 1$  were on average 2.66cm longer at birth than those placentas that were scored  $<1$ . There were no significant relationships between placental histopathology and z-score BMI at age 7. However, the general trend suggests that for each unit increase in histopathology score in all domains with the exception of uteroplacental pathology, there is a decrease in BMI at age 7. If confirmed in a larger sample, these data suggest that placental histopathology may be predictive of childhood growth. The placenta deserves greater attention in epidemiologic and studies of fetal programming.

Table 1. Adjusted Associations Placental Histopathology and Birth Weight, Birth Length and BMI at Age 7.

	Birth Weight		Birth Length		z-score BMI at Age 7	
	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI
Histopathology Global Score	-6.28	-18.24, 5.67	0.01	-0.05, 0.07	-0.01	-0.03, 0.01
Fetal Vascular Pathology	146.39	-264.96, 557.74	0.21	-1.80, 2.21	-0.34	-1.46, 0.78
Villi & Intervillous Space Pathology Score	-13.91	-32.49, 4.67	-0.03	-0.12, 0.06	-0.01	-0.05, 0.02
Uteroplacental Pathology Score	35.47	-488.21, 559.15	2.66*	0.27, 5.04	0.07	-1.22, 1.36

Adjusted for, maternal age, annual household income, \* p<0.05